STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTH CENTRAL REGION OFFICE
3500 INDUSTRIAL BOULEVARD
WEST SACRAMENTO, CA 95691

EDMUND G. BROWN JR., *Governor*

July 9, 2014

Mr. Campbell Ingram
Executive Officer
Delta Conservancy
1450 Halyard Drive, Suite 6
West Sacramento, California 95691

Dear Mr. Ingram:

On behalf of the Department of Water Resources' North Central Region Office (NCRO), I would like to express our sincere appreciation for the outstanding efforts of Kristal Davis-Fadtke on completing the Sacramento-San Joaquin Delta Regional Report for the California Water Plan (CWP) Update 2013. Ms. Davis-Fadtke was diligent in coordinating with state and local agencies, along with regional stakeholders, to obtain information and verify accuracy of the regional data and content. She remained in constant communication with NCRO staff and ensured timely delivery of the Report at various stages of the CWP Update 2013 process. Ms. Davis-Fadtke's excellent work in compiling the information into the Sacramento-San Joaquin Delta Regional Report was also recognized by DWR's editors; an editor commented that the Delta Report is "one of the best written chapters" he has seen for Update 2013. The contributions from Kristal were vital to the successful completion of the CWP Update 2013.

We are all fortunate to benefit from Ms. Davis-Fadtke's contributions on this very important planning document for California water resources management and we look forward to the continued collaboration between NCRO and the Delta Conservancy.

Sincerely,

Eric Hong
Chief, North Central Region Office
Division of Integrated Regional Water Management

cc: Gary Lippner, Department of Water Resources
Lewis Moeller, Department of Water Resources

SACRAMENTO - SAN JOAQUIN
DELTA CONSERVANCY
A California State Agency

July 14, 2014

Paula Trigueros
Contract Manager
Association of Bay Area Governments
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: Support for Association of Bay Area Governments' Application for EPA San Francisco Bay Water Quality Improvement Funds – Low Dissolved Oxygen and Methylmercury Water Quality Objectives Attainment Field Testing in Suisun Marsh

Dear Ms. Trigueros:

I am writing to express our agency's support for the grant application submitted by the Association of Bay Area Governments (ABAG) for funding the above-referenced project. The mission of the Delta Conservancy is to protect, enhance, and restore the economy, agriculture and working landscapes, and environment of the Sacramento-San Joaquin River Delta and Suisun Marsh. The information gained from this project will aid the Conservancy in achieving its mission.

As cooperating entity on this proposal, the Delta Conservancy will provide $33,500 of in-kind match of staff services through our Education and Outreach Program. Our role will be to provide staff time to organize and carry out two public workshops to engage interested parties and stakeholders in this effort and disseminate the results as they pertain to land management practices that may be beneficial within and outside of Suisun Marsh. We also understand that up to $2,000 will be available through the grant to cover room reservation fees and other direct expenses for these two meetings. If you have any questions regarding our support for this proposal, or our proposed role, please contact me at (916) 375-2089 or cingram@deltaconservancy.ca.gov.

Sincerely,

Campbell Ingram
Executive Officer

SACRAMENTO - SAN JOAQUIN
DELTA CONSERVANCY
A California State Agency

August 8, 2014

S. D. Bechtel, Jr. Foundation
Allison Harvey-Turner, Joya Banerjee, and Melanie Askay
P.O. Box 193809
San Francisco, CA 94119-3809

Subject: Submission of Final Basin Report

Dear Ms. Harvey-Turner/Banerjee/Askay:

Please find the Final Report for the Basins Study Proof of Concept (POC). Thank you for supporting this exciting project. The results of the POC clearly demonstrate the potential for transformative change in how California water resources and aquatic ecosystems (and natural resources more broadly) are managed. Ongoing efforts by the Delta Conservancy to implement elements of the POC show that our findings are relevant and already driving real change in California water resources and aquatic ecosystem management.

Our key achievements during the POC include the following:

- Providing clear proof that the correct organization of resources - human, data, and software - yields better decisions in the management of natural resources
- Creating interest in additional applications for big data approaches to natural resources management
- Demonstrating the ability to rapidly integrate large data sets for assessment by natural resources subject matter experts
- Providing a collaborative platform to verify complex natural resource analysis findings
- Connecting technical analyses seamlessly to presentations for policy-level decision-makers
- Introducing the concept of "workflow" to management of natural resources

SUMMARY

Our team developed the POC to assess whether Big Data analytics could improve the speed, efficiency, and effectiveness of California water management. We found that our concept was correct, and our Big Data platform was successful. It allowed for rapid integration of both structured and unstructured data, facilitation of complex analyses by interdisciplinary teams, and creation of a knowledge management resource that includes large volumes of data and sophisticated analytics for California water resources and aquatic ecosystem management.

During the POC, we imported the concept of "workflow" from software developers who regularly conduct complicated analyses. In software development, complex workflow is often made possible by an efficient organization of resources that processes large volumes of complicated data to produce conclusions and useful information products. Workflow generally refers to a structured interaction between data, software, and people that allows for consideration of complex technical questions, and captures associated interactions to support future knowledge on the subject. By comparison, in natural resources (especially California water resources and aquatic ecosystems), workflow has traditionally been ad hoc, and knowledge is easily lost or misfiled.

The POC clearly demonstrated that improved workflow can take advantage of a Big Data platform that connects data to decisions. Our final report describes two detailed examples of this approach: a review of impacts of proposed water operations on endangered fish; and a new tool for assessing future operations under alternative conditions that might occur due to climate change.

We conclude that there is a need for an agency or task force that could regularly implement a workflow similar to the version identified in the POC. Such an entity would have a substantial impact on the status quo in California water resources and aquatic ecosystem management. Such an "Analysis Hub" could work with existing experts to quickly integrate, explore, analyze, visualize, and communicate the mountains of data available and begin to improve water resources and aquatic ecosystem resilience in a way not possible with current approaches. We believe that a full-scale pilot effort would have a ripple effect, as successes and demonstrated capabilities are incorporated across other resource management agencies.

CHALLENGES

Our initial POC called for additional funding from participating agencies and other non-profit entities in order to completely mirror the USBR Basins Study. We were unable to secure such funding. Regardless, because the workflow was substantially more efficient than originally anticipated, and the technology far exceeded expectations, we were able to deliver a substantial amount of technical support to the Basin Study. The disruptive nature of technological advances provides a challenging paradox to resource agencies. New technology should be transformative if it requires significant funding to implement -- it should be a "big

splash" that results in fundamental change in the way an institution operates. However, in order to be readily acceptable to managers and their line staff who would implement and use the technology, it needs to have a "small splash" such that it is easily implementable and avoids major disruption. This paradox limits the ability of resource agencies to implement new technological processes.

The rate of change and the ability to drive technological innovation is far more dynamic in other sectors such as finance, intelligence, retail sales, and health care. Accordingly, acceptance and implementation of new technology occurs at a much faster pace in these sectors. In natural resources, the inability to incorporate innovation is becoming an acute issue. We are facing a rapidly changing climate and increasingly vulnerable ecosystems. Increasingly, we simply lack the ability to make and defend complex decisions. Our management institutions are ponderous in spite of their collections of world-class expertise. The challenge identified by this POC is the same as the general challenge faced by natural resources management everywhere -- how to manage a rapidly changing landscape with institutions and tools that are not equipped to move quickly? There is a need for a "bridge" to connect the current state of technology to the current state of agency financing and technological capabilities. Without such an effort, natural resource management will continue to lag behind other sectors in terms of technological capacity, and ecosystems will continue to suffer.

CONCLUSION

Again, thank you for the support from the S. D. Bechtel, Jr. Foundation, we believe that it has provided important momentum to prove that advanced technical approaches are possible in natural resource management. If the S. D. Bechtel, Jr. Foundation has interest in further funding of similar Big Data efforts, we would be interested in incorporating our lessons learned to other; ongoing projects in order to find any synergies that might exist between efforts and to improve the general state of knowledge and expertise on the subject.

Please let us know if you have any questions, I can be reached at (916) 375-2084 or via e-mail at cingram@deltaconservancy.ca.gov.

Sincerely,

Campbell Ingram,
for: Executive Officer

Enclosure

Final Report: Basins Study Proof of Concept

Using data to create a better functioning Delta

Introduction

> [M]ost water interests either benefit directly from planning, or prolong planning to avoid decisions unfavorable to them. For the former, include universities, agency staff, some non-profits, and the burgeoning agency-consultant industrial complex that thrives off of water planning. All are made relevant during planning and not so relevant once the plan is done.
>
> Jeff Mount, "The Stockholm Syndrome in Water Planning in California"

The Bechtel Foundation funded a Proof of Concept for the Delta Conservancy to explore the use of new technological approaches for managing California's water resources. The key concept to prove was whether the correct organization of resources – human, data, and software – could better address large-scale ecosystem questions in natural resources than standard approaches.

The effort set out to parallel the the US Bureau of Reclamation's Basins Study, which - as prescribed under the Secure Water Act of 2009, authorizes Reclamation to "assess specific risks to the water supply of each major Reclamation basin with respect to presently observed and projected future impacts of climate change on water resources." We regularly coordinated with Reclamation on their study, collected data, and developed analyses using a "big data" platform. The analyses and tools will be available as a comparison to the deliverables from the conventional Basins Study.

We found that our concept was correct. The software platform performed brilliantly. It allowed for rapid uptake of massive amounts of data and provided analysis tools that made complex systems understandable. Our subject-matter experts were able to quickly draw conclusions from large data sets, and then verify these conclusions among other experts and present findings to policy-level decision-makers. We call this interaction between data, software, and people "workflow" and it represents the most important finding of the Proof of Concept effort. The proof that the proper organization of resources - human, data, and software - was able to efficiently reach meaningful conclusions is the primary conclusion of this report.

Establishing an agency or task force that could regularly implement workflow would have a substantial impact on the status quo in California water planning. For the purposes of this report, we refer to this theoretical entity as an "Analysis Hub" dedicated to working with existing experts to better understand the mountains of data available. Circular planning processes as described by Dr. Mount would be disrupted by such an entity because it could consistently and quickly answer key technical questions and develop a solid base of knowledge for decision-making.

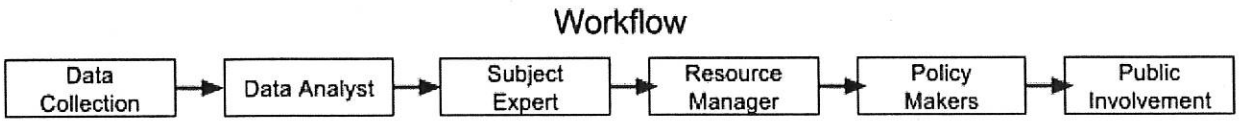
Based on the lessons of this Proof of Concept, we recommend establishment of an Analysis Hub. The Hub would be relatively small and agile, probably centered on a core team of 5-7 analysts and support staff working with teams of experts from various agencies.

Workflow

> Despite its role as one of the centers in the world's information economy, California woefully lags on information and analyses of water use, flows, quality, and costs—essential tools to support modern water management goals.
>
> Ellen Hanak, et al, "Managing California's Water: From Conflict to Reconciliation"

The concept of workflow is somewhat foreign to natural resources. For our purposes, we have borrowed the term from "big data" applications that regularly develop managed and repeatable patterns of analysis, and are enabled by an efficient organization of resources that process information. For us, workflow refers to a structured interaction between data, software, and people that allows for consideration of complex technical questions.

Our concept of workflow includes the collection and organization of the data; analysis and interpretation of data; presentation of empirical conclusions to resource managers and policy makers; and ultimately a defensible and rational decision for the public. It must also be repeatable. In a sense, workflow is linear in that it allocates efforts along a continuum according to specialty. The effect is that resources are allocated more efficiently. For example, it is not reasonable to require every subject-matter expert to be proficient at both data integration and presentation of technical analyses to the general public. Both are important skills separately.



In current practice, it is common for an individual to undertake multiple parts of an analysis. A project manager may also be a subject expert who conducts her own analysis and maintains her own data. Further, that same project manager may also be responsible to a resource manager and present findings to the public. With a collection of such uber-skilled individuals (were they to exist), the Delta might not be in crisis.

More likely, existing expertise in the Delta is often underutilized, as many professionals take on multiple roles causing a slow-down in the ability to reach conclusions. In our proof of concept, we were able to overcome the need for "polyglot Supermen and Wonder Women," in part, by accessing ever-expanding computing power and making use of advances in analytic software developed for other sectors. This allowed us to spread the workflow among more subject matter experts. Software engineers tackled the problems of data integration, thus allowing fish biologists to concentrate on fish.

The above linear description of workflow is only partially complete. A linear workflow does not adequately reflect the iterative nature of answering complex questions. Consider the following conceptual model from the Bay Delta Conservation Plan (Figure 3.6-2). It describes the predation effects of BDCP conservation measures on the life cycle of Delta smelt. A linear workflow approach would not be adequate to identify all the data required to evaluate the various processes in one step, then presenting that data en masse to a subject expert (or experts) who could then report a single finding to

a resource manager and ultimately affect policy and become part of the public debate. The model itself is complex and likely no more than a single snapshot of the ongoing development of scientific understanding of a species.

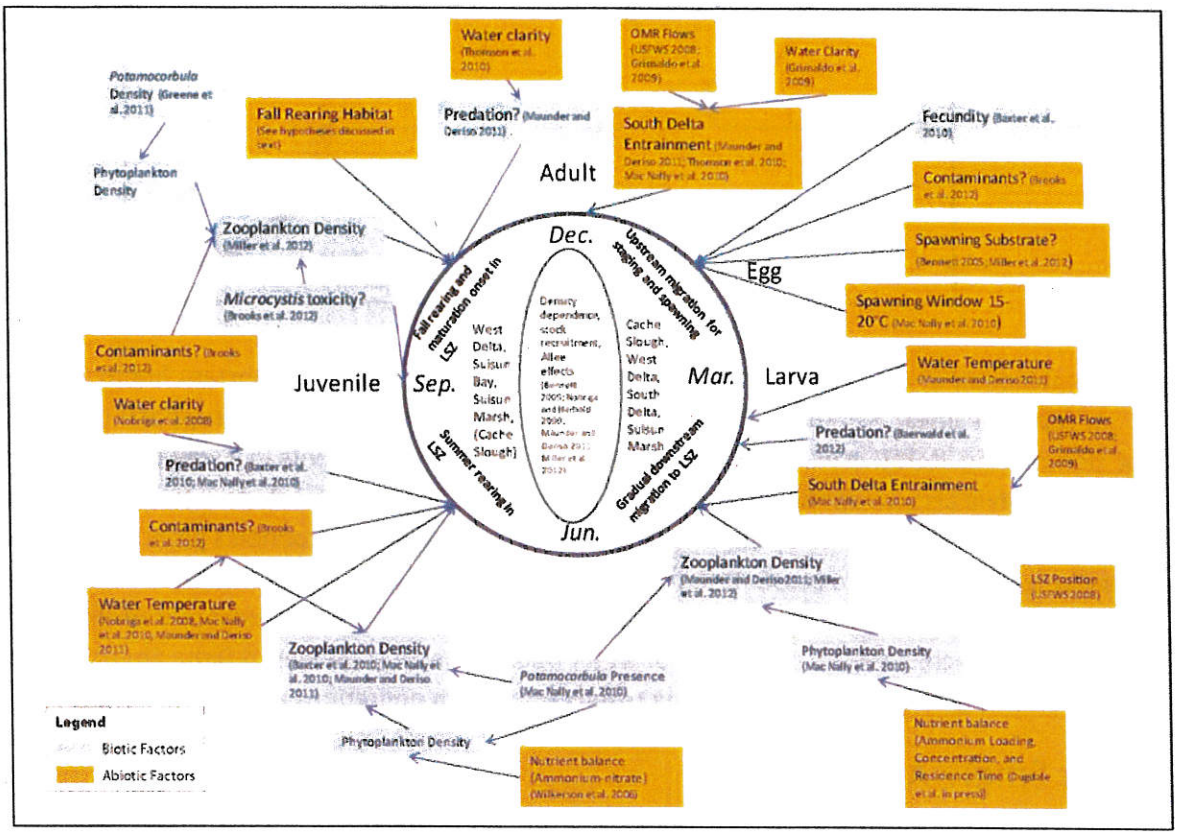
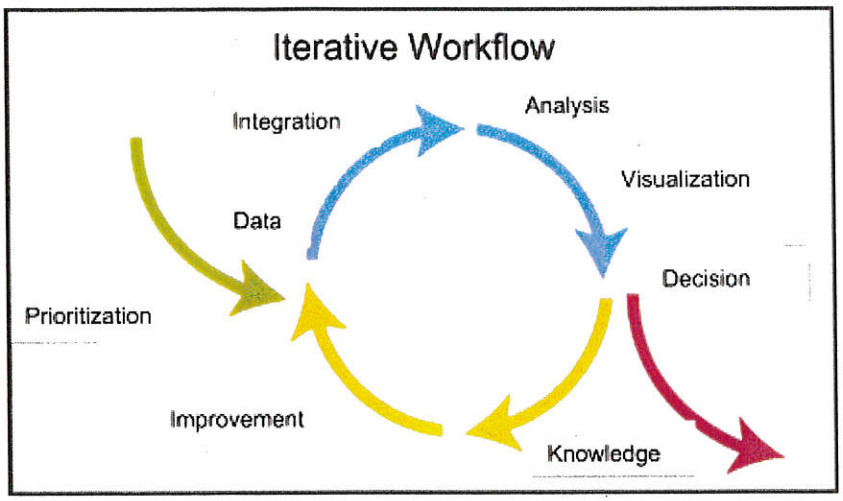


Figure 3.6-2
Conceptual Model of Predation-Related Effects of Conservation Measures on Delta Smelt

That's not to suggest that predation-related effects on Delta smelt are so complex that they are unknowable. Lots of things are complex. Many things are complex things are managed. Figure 3.6-2 is an example of a complex system constructed from 31 separate functions, most of which are referenced to specific reports or studies. A structured approach to Figure 3.6-2 might systematically integrate the data, function by function, revisiting any discrepancies as they are uncovered and revise conservation measures as appropriate. In short, using our approach, it would be possible to iterate towards a more comprehensive understanding of predation effects on endangered Delta smelt and use the knowledge to inform decisions about management of the Delta.

Advanced computing and analytics make it possible to hold and manage more data than ever before. However, some of the most promising developments have come in the ability to track many small changes simultaneously so that small interactions between data can be checked, tested and refined. Small pieces of functionality can then be built into larger, more complex processes. Which leads to our second definition of workflow: the iterative nature of workflow.



The combination of linear and iterative workflows represents the most important findings of the Proof of Concept. The linear workflow provides structure that produces results and supports data-driven decision-making. Iterative workflow allows for continuous improvements in a way that allows for rapid discovery, while also accepting the reality that many times, incremental steps may be small. These workflows are made possible by our software platform. The platform connects granular data management to big picture presentations. The platform also greatly increases the speed of iteration, allowing for a near constant stream of decision output. Following are two examples of this combined workflow approach: a review of impacts of water operations on endangered Delta Smelt, and; a new tool for assessing future CALSIM modeling results for system operations under new conditions.

Delta Smelt Analysis

> The Delta has a special problem because the south Delta export pumps are large enough to change the way water—and fish—move through the Delta.
>
> Peter Moyle, et al, "Where the Wild Things Aren't"

Early meetings with USBR staff identified south Delta operations as an area of concern for the Basin Plan. Future operations of the south Delta are considered to be uncertain, making it difficult to analyze future climate change scenarios. The south delta is the location of large pumping facilities that have the capacity to dramatically change flow pattern in the Delta, particularly during periods of lower flow.

Often, these changed flow pattern effectively make rivers flow uphill, towards the pumps, where fish are subject to increased mortality; both directly -- from entrainment into the pumps, and indirectly -- from predators and poor habitat conditions. The focal point for analysis of uphill, or "reverse" flows is usually a location called Old and Middle River (OMR). A simplified example of Delta operations and resulting river flows are summarized in the following figure taken from Hallock, et al, 1970.

The effect of reverse flows in the south Delta is a particular concern for endangered Delta smelt. Delta smelt are relatively weak swimmers who are considered especially vulnerable to Delta operations.

Various proceedings and lawsuits have changed operations of the pumps over the years, but the population of Delta smelt is still considered to be at levels of near extinction.

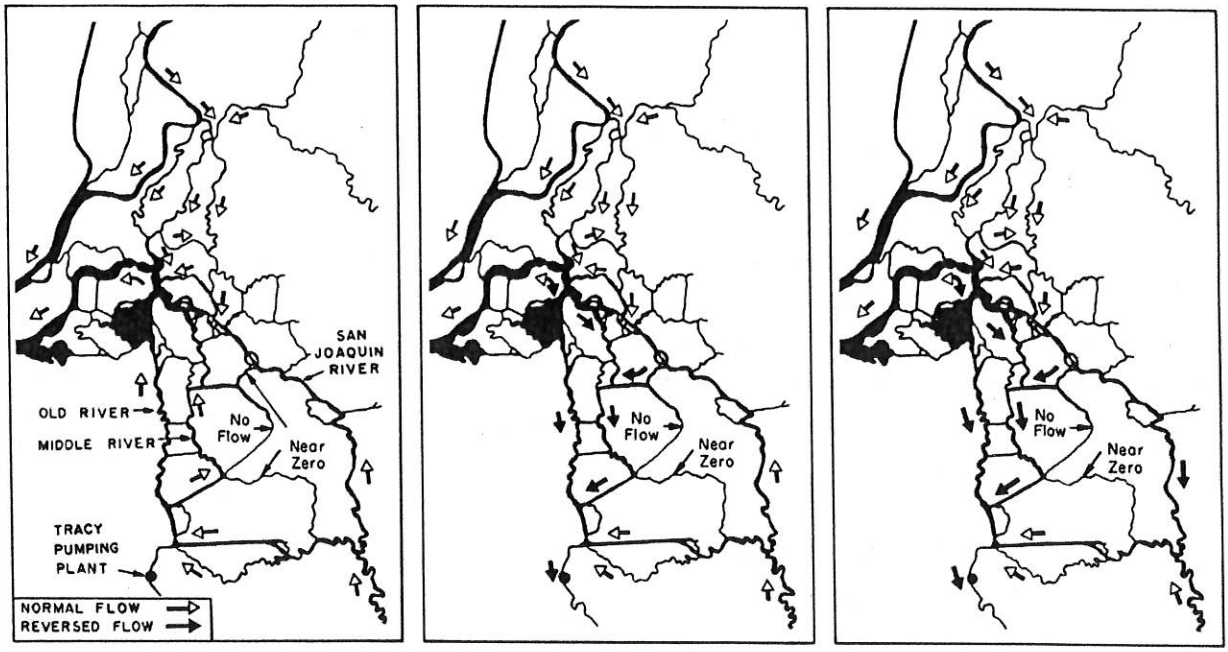


FIGURE 2. Direction of currents in the Sacramento-San Joaquin Delta. Tidal reversals not shown.
LEFT: Normal flows. Tracy Pumping Plant not taking water.
CENTER: With pumping. Old and Middle rivers have reversed, but San Joaquin River still flows normally.
RIGHT: San Joaquin River has reversed.

Hallock et al, 1970, "Bulletin 151, Migrations of Adult King Salmon"

The Bay Delta Conservation Plan (BDCP) proposes to modify operations south Delta operations by constructing a diversion in the north Delta and conveying water via a series of tunnels to the diversion point in the south. This proposed operation is intended, in part, to improve environmental conditions and reduce impacts from south Delta operations.

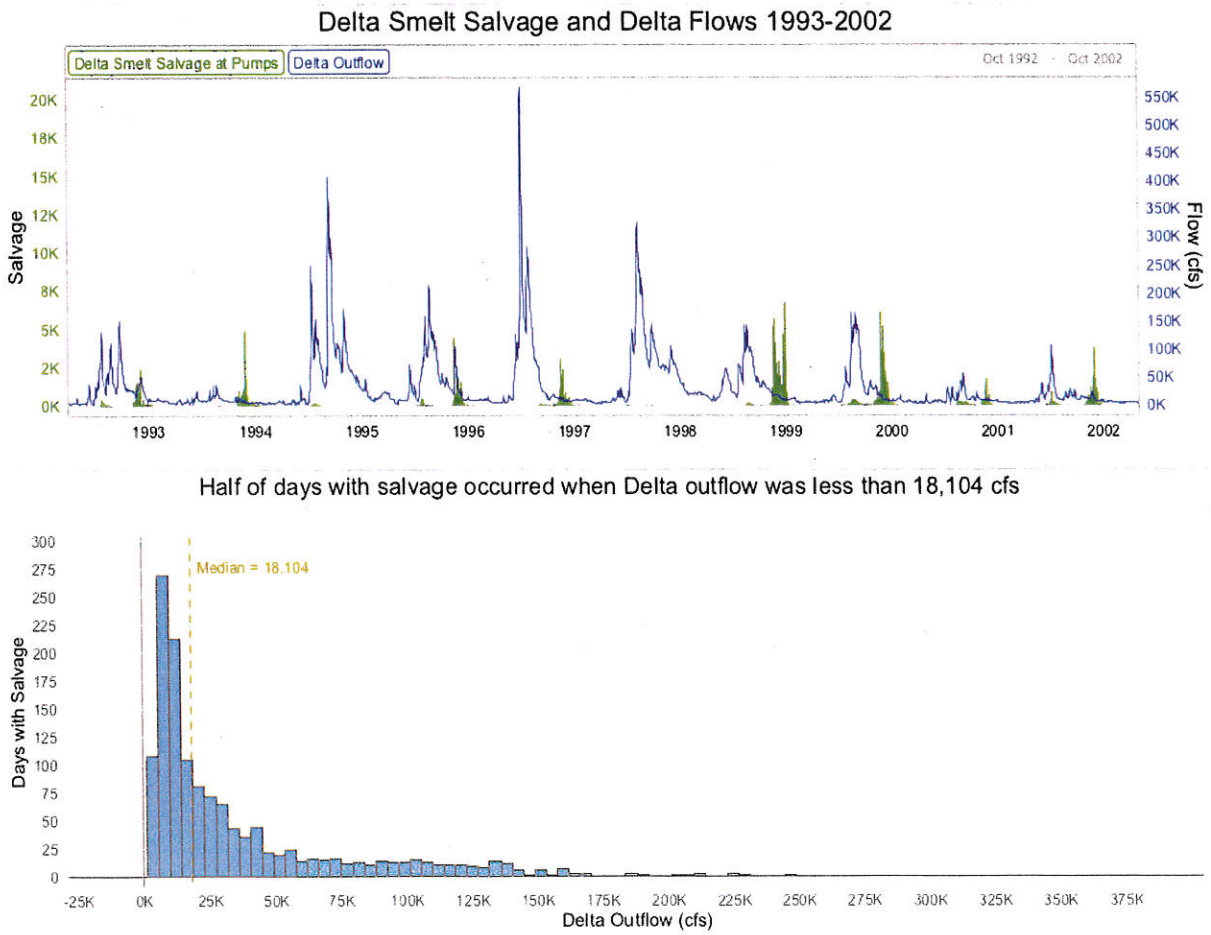
The BDCP effects analysis describes the effects of the new operations in the following two paragraphs:

> [T]he timing of Delta exports and outflows is adjusted to specifically benefit the aquatic ecosystem and covered fish species. While this reduces some Sacramento River flows, the frequency and magnitude of reverse flows in Old and Middle River (OMR) will be substantially reduced because of the reduced use of the south Delta export facilities in most water-year types.
>
> Greater use of the north Delta intakes in wet, above-normal, and below-normal water years would lead to considerably less overall entrainment under the BDCP; whereas relatively greater reliance on the south Delta export facilities in dry and critical years would result in similar overall entrainment under the BDCP and existing conditions. Of probable importance to the delta smelt population is the avoidance of appreciable losses in both the adult and subsequent

larval/juvenile population (Appendix 5.B, Section 5.B.6.1.5.2; Baxter et al. 2010). Therefore, it is concluded with high certainty that the BDCP would result in a moderate positive change to this attribute for adult delta smelt, i.e., moderately less south Delta entrainment loss

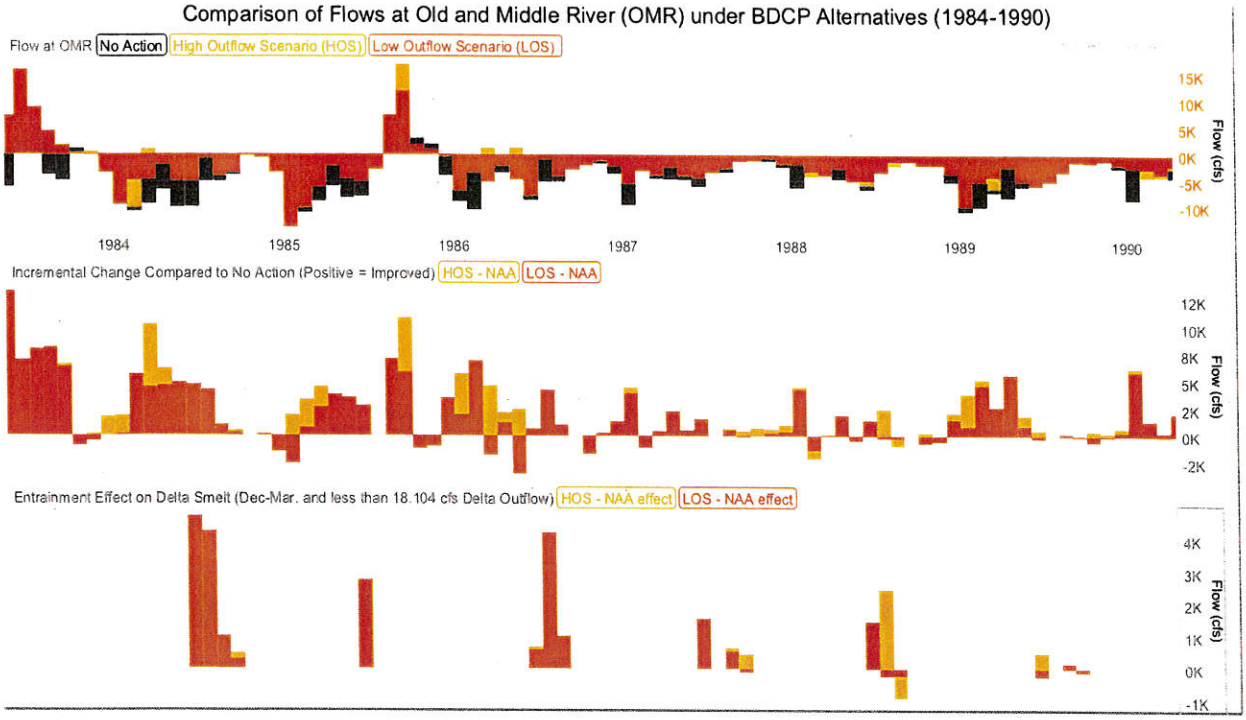
Our analysis considered the future operations of the south Delta under BDCP and considered the effects on Delta smelt by taking modeled operations of the Delta and reviewing changes with a fisheries expert with extensive experience in Delta smelt life history. We began with a review of recent Delta operations and measured effects on Delta smelt.

Direct entrainment of Delta smelt is measured as salvage at the south Delta pumps. Periodically, the pumps are stopped and sampled for entrained fish. These samples are then projected to estimate a total effect on fish and serve as a basis for managing exports. The following figure was used in our analysis to develop a threshold to determine when conditions occurred that were a concern for Delta smelt. Our fisheries expert determined that of the days with measured salvage in the south Delta, half occurred when Delta outflow was less than 18,104 cfs.



This threshold, combined with the times of year that smelt are present at the south Delta pumps, allowed us to focus our review on modeled periods when smelt are more susceptible to entrainment at

the pumps. Direct entrainment at the pumps is not a parameter modeled by CALSIM II. As a surrogate measure we considered modeled conditions at a location very close to the south Delta pumps, Old and Middle River (OMR). OMR flows are often negative, indicative of a direct pathway to the pumps. The following figure highlights the effect on smelt for the years 1984-1990 in the modeled BDCP output[1].



A similar analysis was repeated for all of the fish species considered in the BDCP Effects Analysis over a period of approximately 8 weeks. The entire collection is available to USBR for consideration of future effects of south Delta operations under future climate conditions. Additionally, the collection is easily updatable should additional CALSIM runs become available by simply uploading the new modeling results and swapping out the old results.

CALSIM Modeling Analysis

> Environmental laws will require that water users respond to these changes with potentially costly management actions (e.g., altering reservoir operations). Anticipating the likely changes would allow the design of more cost-effective responses.
>
> Ellen Hanak, "California's Future: Water"

The CALSIM II computer model was jointly developed by the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (USBR) to simulate operations in the Central Valley under

[1] The CALSIM modeled period of analysis is 1921-2003. The model uses assumptions about future levels of development and/or changes in operating assumptions and subjects those assumptions to the hydrology that occurred between 1921 and 2003.

various assumptions. CALSIM II forms the basis of many planning decisions in California water, particularly those affecting operations of the State Water Project (SWP) and the federal Central Valley Project (CVP). As the official model of those projects, CALSIM II is the default system model for system-wide analysis of water in the Central Valley of California. Originally developed in the mid-1990's, CALSIM is terribly antiquated and forms a lasting impediment to many modern approaches to water analysis in the state. However, it remains the standard, and several efforts to supplant it have failed.

For example, in the recent BDCP analyses, CALSIM model output underpins all of the subsequent modeling used to assess environmental impacts. The cascade of models in the following schematic is from the BDCP Modeling Technical Appendix.

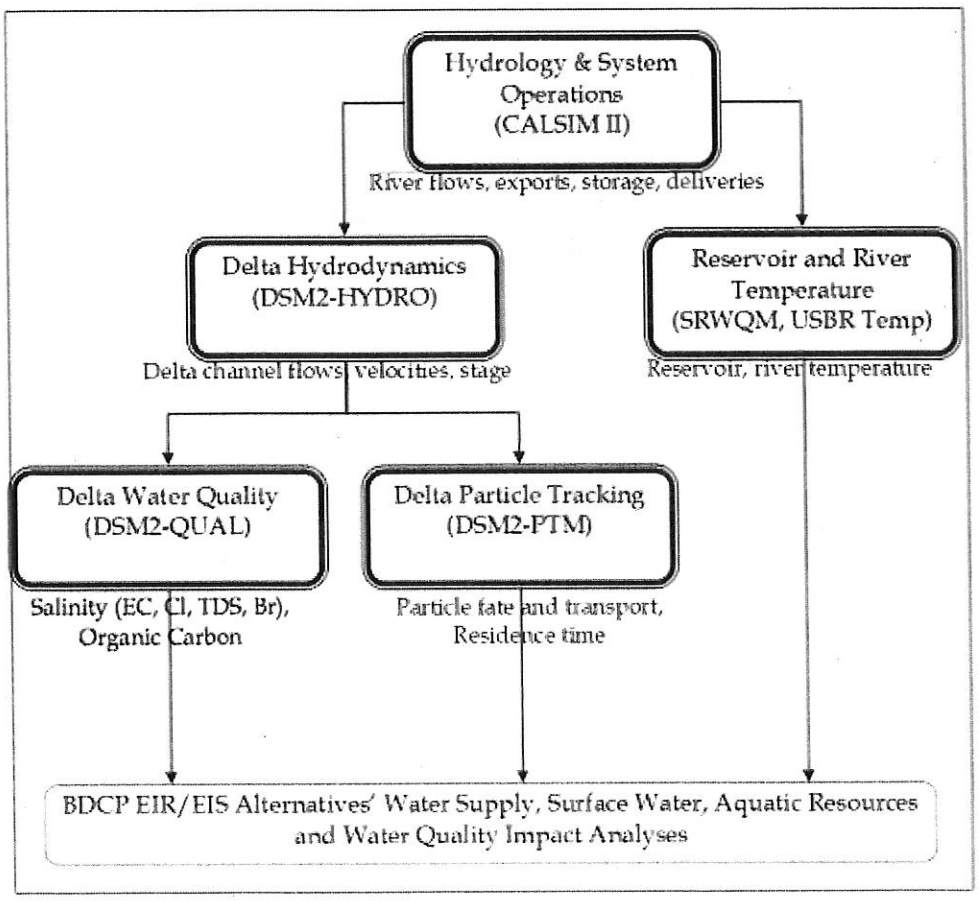


Figure A-1: Analytical Framework used to Evaluate Impacts of the Alternatives

Limitations of the modeling approach are spelled out on page SA-A23 of the Technical Appendix:

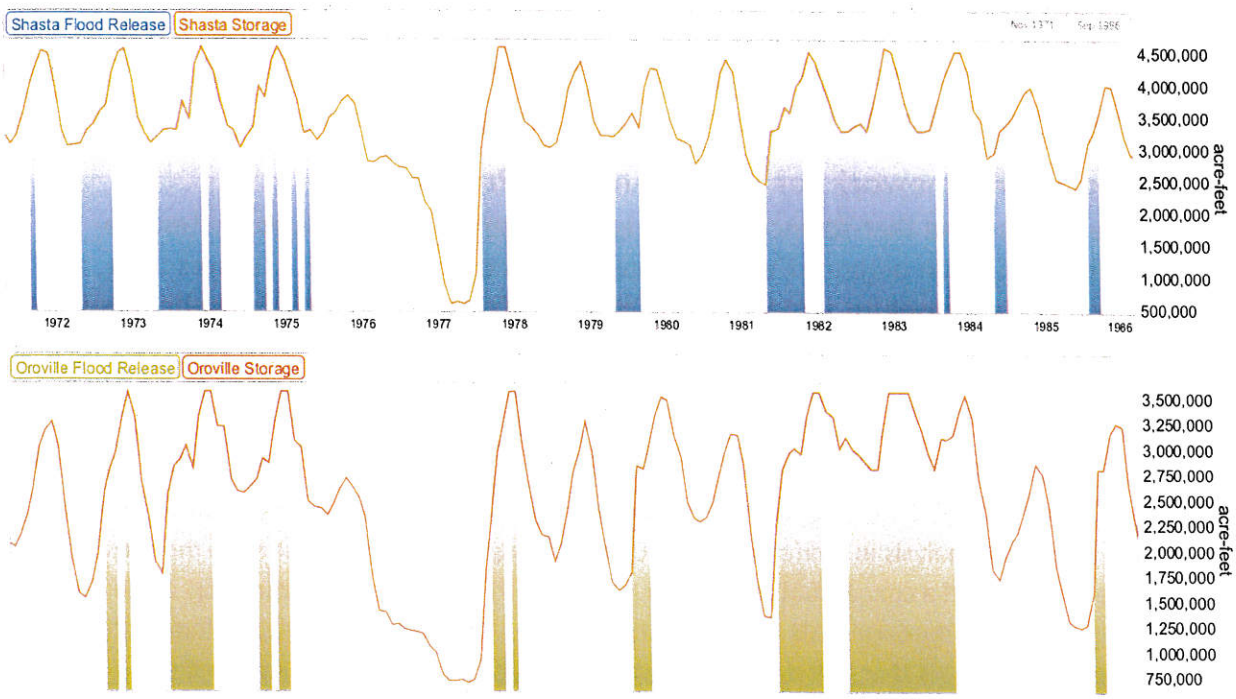
> The CALSIM II simulations do not consider future climate change adaptation which may manage the SWP and CVP system in a different manner than today to reduce climate impacts. For example, future changes in reservoir flood control reservation to better accommodate a seasonally changing hydrograph may be considered under future programs, but are not

considered under the BDCP. Thus, the CALSIM II BDCP results represent the risks to operations, water users, and the environment in the absence of dynamic adaptation for climate change.

For the USBR Basins Study, the inability to consider alternative reservoir operations in the face of a changing climate is a significant shortcoming. In future climate scenarios, it will be important to understand how existing facilities might operate differently to accommodate the environmental, flood, water supply and power generation needs. To look at options, our team worked with a Water Resources Modeler from the USBR Division of Planning to review the comprehensive output of the CALSIM model, particularly the logic used to "optimize" solutions for each month of the 82-year period of simulation.

In each month of the 82-year period, CALSIM runs through nine cycles that impose operational rules and conditions. For each point and connection in the model -- over 300 "nodes", interconnected by over 900 "arcs" -- CALSIM implements computer code that replicates various system constraints, including agricultural demand, endangered species constraints, groundwater conditions, water quality objectives and flood conditions. The final result after the ninth cycle then sets the input conditions for the subsequent month.

In a series of work sessions with USBR's water resource modeler, we were able to generate output for each cycle of two sample CALSIM runs, and determine the controlling logic behind each month's operation. In the case of flood operations, we developed a lookup function that determined when reservoirs in the Central Valley were being governed by flood releases. This lookup function is only made possible by considering the full set of output data.



Similar analyses were conducted for other controlling factors, including water quality, minimum instream flow and delta export requirements. USBR staff have requested expansion of these analyses to accommodate more detailed review of operations under climate change and to assess proposed system changes such as Shasta Dam raise, temperature management during drought, changes to Delta water quality requirements, and legislation that would affect groundwater management or surface water allocations. Currently, there is no mechanism to support these requests.

Recommendations

> Better technical and scientific information, analysis, and synthesis will be an essential support to better policy.
>
> Ellen Hanak, et al, "California Water Myths"

The correct organization of resources – human, data, and software – can address large-scale ecosystem questions in natural resources. Quite simply, tools and processes exist that would greatly improve the connections between data, science, and policy. Our Proof of Concept focused on two elements of the USBR Basins Study; south Delta operations and system-wide modeling. As a result, staff from the USBR San Joaquin Restoration office, Division of Planning, and the office for the Central Valley Project Improvement Act have all attempted to procure additional studies and further use tools as part of a pilot effort. The key question, therefore is not if, but when?

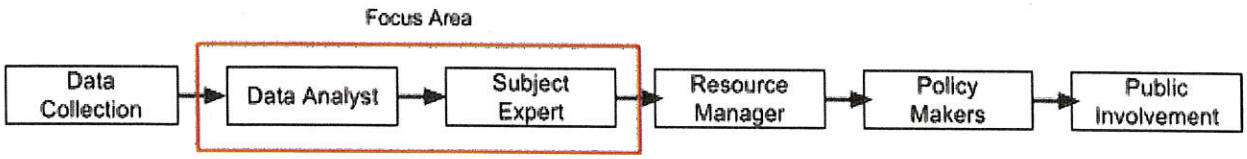
Unfortunately, our initial findings indicate that institutional barriers are greatly hindering implementation of additional pilot efforts. An intermediate effort funded over three years would possibly bridge the gap between agency acceptance and agency implementation. In the absence of intermediate funding, momentum would be lost, species would continue to decline, and our system will fall further behind in preparations for a changing climate. The following section describes how a Pilot Analysis Program might operate during the interim period.

A Conceptual Framework for a Pilot Analysis Program

> We recommend that science for multiple stressors in the Delta ecosystem be addressed by an organization that pools resources, plans jointly, shares data, and commits to consensus understanding of scientific results and their implications for management.
>
> Brian Gray, et al, "Integrated Management of Delta Stressors"

The Basin Study Proof of Concept established that new technological tools could vastly improve the speed and quality of analysis in California water by leveraging existing expertise with modern computing power. We recommend a conceptual framework for future Pilot Analysis Program that could pair existing expertise with modern tools in a productive manner. The Pilot Program is intended to provide synergy and analysis tools that link the accumulated knowledge of delta processes and the ever-expanding trove of data. We believe that such a Program would support data-driven decision-making that might keep up with the rapid pace of species decline and climate change. The status quo clearly will not.

Investigations would inform resource managers and ultimately be available to policy makers and the public. As demonstrated by the Proof of Concept, the correct organization of resources – human, data, and software – can address large-scale ecosystem questions. However, the sector currently lacks institutions with the capability to do so. Several agencies have expressed an immediate need for improved analytics demonstrated in the Proof of Concept, but have indicated institutional barriers to immediate implementation. The Pilot Analysis Program would bridge this gap.



Proposed Mission

The mission of the new institution would be to integrate data from multiple sources and provide evidence for decision makers on topics relating to management of the California water system. Taken as a whole, the system is too large to assess comprehensively. However, we believe it is possible to make progress on multiple investigations by supporting a workflow between subject-matter experts and "big data" analytic tools. Through effective knowledge management, these investigations may provide building blocks for a better understanding of the larger landscape-scale ecosystem. Analysis teams and their work product would form the core competency of the new institution. Success would be measured on the quality and quantity of evidence made available for decision makers.

The Nature Conservancy
Protecting nature. Preserving life.™

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nature.org

August 22, 2014

Alexander R. Coate
General Manager
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

Re: McCormack-Williamson Tract Levee Modification and Habitat Development

Dear Alex, ~~Mr. Coate~~:

Thank you for your recent letter regarding the McCormack-Williamson Tract (Tract) Levee Modification and Habitat Development Project (Project). We greatly appreciate EBMUD's interest and involvement in this Project and look forward to working with you as a full partner as it progresses.

To say that this project has not gone as planned would be an understatement. A bit of history illustrates my point. Back in 1999, the Nature Conservancy ("TNC") purchased the Tract for $5.35M in 1999 using federal funds granted from the US Fish and Wildlife Service (USFWS) through the CALFED Bay Delta Program. Ownership of the Tract was to be transferred to USFWS or its designee within three years; however, due to a variety of factors including legal determinations regarding levee liability (e.g. *Paterno v. State* decision), neither USFWS nor any of the potential designees have agreed to take ownership of the Tract and implement the Project.

Even amid this uncertainty, TNC has continued to participate actively in important restoration programs, permitting actions, land stewardship, and consensus-building dialogues across the Delta. Today, TNC and RD 2110 (in which TNC is the sole landowner) are collaborating with the California Department of Water Resources (DWR) to advance permitting related to the Project. To this end, DWR has entered into a Project Funding Agreement with RD 2110 to fund planning, design, and permitting for the Project. As you noted in your letter, we, on behalf of RD 2110, recently issued a Request for Proposals to complete planning, design, and permitting for the Project. TNC and RD 2110 are also exploring early implementation objectives (e.g., improving levees to withstand post-Project tidal inundation) that would support implementation of the larger Project.

Long-term ownership of the Tract is a significant consideration in undertaking the Project, primarily due to the complex liability issues related to breaching levees. TNC is currently in

discussion with DWR regarding its potential ownership and stewardship of the Tract. Funding for a long-term management endowment is another obstacle to any project implementation at McCormack Williamson Tract and elsewhere in the Delta. Our team is actively seeking other qualified organizations capable of taking ownership of the Tract or contributing to a long-term endowment that could facilitate implementation of the Project.

Thank you again for your interest and for EBMUD's support for the Project. Please feel free to contact me or Judah Grossman of my staff at (916) 642-8053, jgrossman@tnc.org if you have any questions.

Sincerely,

Wendy Pulling
Director of Conservation Programs

cc: Secretary John Laird, Natural Resources Agency
Director Mark Cowin, Department of Water Resources
Director Chuck Bonham, Department of Fish and Wildlife
Randy Fiorini, Delta Stewardship Council
✓ Campbell Ingram, Sacramento-San Joaquin Delta Conservancy